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10/673,056	09/26/2003	Abdo Y. Alfakih	Alfakih 1-1-1-6-24	1224

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EXAMINER	
CHU, WUTCHUNG	

ART UNIT	PAPER NUMBER
2619	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/673,056	ALFAKIH ET AL.	
	Examiner	Art Unit	
	WUTCHUNG CHU	2619	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 May 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-15 and 17-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *29 and 30* is/are allowed.

6)☒ Claim(s) *1,7,10-15,21 and 24-28* is/are rejected.

7)☒ Claim(s) *3-6,8,9,17-20,22 and 23* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/8/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This communication is in response to application's amendment filed on 5/6/2008.

Claim Rejections - 35 USC § 103

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 7, 10-15, 21, and 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinomiya et al. (US7188280) in view of Arslan et al. (5706276).

Regarding claim 1, Shinomiya et al. discloses a protecting route design method in a communication network **(see column 1 line 64-66)** comprising:

- receiving one or more demands for service **(see column 4 line 2-4)** in a mesh network **(see column 11 line 17)** comprising a plurality of nodes interconnected by a plurality of links **(see column 4 line 10 and 53)**; and

- mapping each of the one or more demands onto a primary path **(see column 4 line 8-9 where the term working communication route corresponds to primary and see figure 1 working communication route)** and a restoration path **(see figure 1 protecting communication route)** in the network to generate a path plan for the one or more demands in the network **(see column 3 line 64)**, wherein
- the mapping generates the path plan **(see column 4 line 8-9 where the term working communication route corresponds to primary and see figure 1 working communication route and column 3 line 64)**

Shinomiya et al. discloses all the subject matter of the claimed invention with the exception of:

- specifying a threshold corresponding to a maximum number of failure-related cross-connections at a node in the network; and
- reduction of a portion of restoration time associated with failure-related cross-connections in the network is taken into account during the mapping,
- based on the specified threshold such that, for all nodes in the mesh network, the number of failure-related cross-connections at each node is no more than the specified threshold.

Arslan et al. from the same or similar fields of endeavor teaches the use of processing decreases the restoration time of the entire circuit **(see Arslan col. 14 lines 45-60)**, and specifies the maximum number of cross-connections **(see Arslan col. 5 lines 13-27)**

where this circuit element is of restoration processor **(see Arslan col. 4 lines 46-65)**, and DACS III-2000 **(see Arslan figure 1 ref 107 is connected to restoration processor)**, and in network **(figure 1 ref 100 network)** each DACS digital cross-connect system **(see Arslan figure 1 107 and ref 109 as a node in the network which is connected to restoration processor and in figure 2 shows a circuit state element in restoration processor)**. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the decreases the restoration time and specifies the maximum number of cross-connections as taught by Arslan in the in a communication network of Shinomiya et al. in order to provide additional robustness to the restoration process by way of enhancements to the functionality of the core algorithm manager module **(see Arslan col. 2 lines 8-22)**.

Regarding claim 7, Shinomiya et al. teaches the mapping comprises:

- selecting two node-disjoint paths for each demand **(see figure 1 working communication route and protecting communication route)**, wherein leveling of link loads **(see column 6 line 52-55)** is taken into account during the selecting; and
- for each demand, identifying one of the two node-disjoint paths as the primary path and the other as the restoration path **(see figure 1 working communication route and protecting communication route)**,

and discloses all the subject matter of the claimed invention with the exception of:

- wherein a maximum number of failure-related cross-connections at all nodes in the network is taken into account during the identifying.

Arslan et al. from the same or similar fields of endeavor teaches the use of specifies the maximum number of cross-connections **(see Arslan col. 5 lines 13-27)**. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the decreases the restoration time and specifies the maximum number of cross-connections as taught by Arslan in the in a communication network of Shinomiya et al. in order to provide additional robustness to the restoration process by way of enhancements to the functionality of the core algorithm manager module **(see Arslan col. 2 lines 8-22)**.

Regarding claim 10, Shinomiya et al. teaches the selecting of the two node-disjoint paths for each demand and the identifying, for each demand, of the one of the two node-disjoint paths as the primary path **(see column 4 line 8-9 where the term working communication route corresponds to primary and see figure 1 working communication route)** and the other as the restoration path **(see figure 1 protecting communication route)** are implemented using mixed-integer programming **(see column 11 line 12 where CPU corresponds to programming; it is inherent that CPU is run by a program, and column 6 line 50-57 teaches parameter of each node which corresponds to mixed-integer)**.

Regarding claim 11, Shinomiya et al. teaches the selecting of the two node-disjoint paths for each demand and the identifying, for each demand, of the one of the

two node-disjoint paths as the primary path **(see column 4 line 8-9 where the term working communication route corresponds to primary and see figure 1 working communication route)** and the other as the restoration path **(see figure 1 protecting communication route)** are implemented using genetic programming **(see column 11 line 12 where CPU corresponds to programming; it is inherent that CPU is run by a program, and column 6 line 50-57 teaches parameter of each node which corresponds to mixed-integer)**.

Regarding claim 12, Shinomiya et al. teaches the selection of the two node-disjoint paths for each demand and the identifying, for each demand, of the one of the two node-disjoint paths as the primary path **(see column 4 line 8-9 where the term working communication route corresponds to primary and see figure 1 working communication route)** and the other as the restoration path **(see figure 1 protecting communication route)** are implemented using a commercial solver **(see column 8 line 48-57)**.

Regarding claim 13, Shinomiya et al. teaches the mapping involves demand bundling, wherein demands having a common source node and a common destination node are grouped **(see column 4 line 2-6 it is inherent that demands would have a common source node and a common destination node)** and routed along a single pair of disjoint primary and restoration paths **(see figure 1 working communication route and protecting communication route)** and at least a portion of connection signaling for the group is carried out jointly **(see column 4 line 2-6)**.

Regarding claim 14, Shinomiya et al. teaches the mapping involves traffic aggregation, wherein multiple low-rate channels in the network are consolidated into a high-rate channel and rerouting of the high-rate channel requires fewer cross-connections than rerouting of the multiple low-rate channels **(see column 4 line 22-27)**.

Regarding claim 15, Shinomiya et al. teaches a network manager for a mesh network comprising a plurality of nodes interconnected by a plurality of links, the network manager **(see figure 4 box 10 and column 7 line 27 corresponds to network manager)** comprising:

- means for receiving one or more demands for service **(see column 4 line 2-4)** in the network **(see column 11 line 17)**; and
- means for mapping each of the one or more demands onto a primary path **(see column 4 line 8-9 where the term working communication route corresponds to primary and see figure 1 working communication route)** and a restoration path **(see figure 1 protecting communication route)** in the network to generate a path plan for the one or more demands in the network **(see column 3 line 64)**, wherein
- the means for mapping generates the path plan **(see column 4 line 8-9 where the term working communication route corresponds to primary and see figure 1 working communication route and column 3 line 64)**

Shinomiya et al. discloses all the subject matter of the claimed invention with the exception of:

- means for specifying a threshold corresponding to a number of failure-related cross-connections; and
- reduction of a portion of restoration time associated with failure-related cross-connections in the network is taken into account during the mapping,
- based on the specified threshold such that, for all nodes in the mesh network, the number of failure-related cross-connections at each node is less than the specified threshold.

Arslan et al. from the same or similar fields of endeavor teaches the use of processing decreases the restoration time of the entire circuit **(see Arslan col. 14 lines 45-60)**, and specifies the maximum number of cross-connections **(see Arslan col. 5 lines 13-27)** where this circuit element is of restoration processor **(see Arslan col. 4 lines 46-65)**, and DACS III-2000 **(see Arslan figure 1 ref 107 is connected to restoration processor)**, and in network **(figure 1 ref 100 network)** each DACS digital cross-connect system **(see Arslan figure 1 107 and ref 109 as a node in the network which is connected to restoration processor and in figure 2 shows a circuit state element in restoration processor)**. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the decreases the restoration time and specifies the maximum number of cross-connections as taught by Arslan in the in a communication network of Shinomiya et al. in order to provide additional robustness to the restoration process by way of enhancements to the functionality of the core algorithm manager module **(see Arslan col. 2 lines 8-22)**.

Regarding claim 21, Shinomiya et al. teaches the mapping comprises:

- selecting two node-disjoint paths for each demand **(see figure 1 working communication route and protecting communication route)**, wherein leveling of link loads **(see column 6 line 52-55)** is taken into account during the selecting; and
- for each demand, identifying one of the two node-disjoint paths as the primary path and the other as the restoration path **(see figure 1 working communication route and protecting communication route)**,

and discloses all the subject matter of the claimed invention with the exception of:

- wherein a maximum number of failure-related cross-connections at all nodes in the network is taken into account during the identifying.

Arslan et al. from the same or similar fields of endeavor teaches the use of specifies the maximum number of cross-connections **(see Arslan col. 5 lines 13-27)**. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the decreases the restoration time and specifies the maximum number of cross-connections as taught by Arslan in the in a communication network of Shinomiya et al. in order to provide additional robustness to the restoration process by way of enhancements to the functionality of the core algorithm manager module **(see Arslan col. 2 lines 8-22)**.

Regarding claim 24, Shinomiya et al. teaches the means for performing the selection and the means for identifying the primary **(see column 4 line 8-9 where the term working communication route corresponds to primary and see figure 1 working communication route)** and restoration paths **(see figure 1 protecting communication route)** are implemented using mixed-integer programming is used in each of the selecting and the identifying **(see column 11 line 12 where CPU corresponds to programming; it is inherent that CPU is run by a program, and column 6 line 50-57 teaches parameter of each node which corresponds to mixed-integer)**.

Regarding claim 25, Shinomiya et al. teaches the means for performing the selection and the means for identifying the primary **(see column 4 line 8-9 where the term working communication route corresponds to primary and see figure 1 working communication route)** and restoration paths **(see figure 1 protecting communication route)** are implemented using genetic programming **(see column 11 line 12 where CPU corresponds to programming; it is inherent that CPU is run by a program, and column 6 line 50-57 teaches parameter of each node which corresponds to mixed-integer).**

Regarding claim 26, Shinomiya et al. teaches the means for performing the selection and the means for identifying the primary **(see column 4 line 8-9 where the term working communication route corresponds to primary and see figure 1 working communication route)** and restoration paths **(see figure 1 protecting**

communication route) are implemented using a commercial solver **(see column 8 line 48-57)**.

Regarding claim 27, Shinomiya et al. teaches the mapping involves demand bundling, wherein demands having a common source node and a common destination node are grouped **(see column 4 line 2-6 it is inherent that demands would have a common source node and a common destination node)** and routed along a single pair of disjoint primary and restoration paths **(see figure 1 working communication route and protecting communication route)** and at least a portion of connection signaling for the group is carried out jointly **(see column 4 line 2-6)**.

Regarding claim 28, Shinomiya et al. teaches the mapping involves traffic aggregation, wherein multiple low-rate channels in the network are consolidated into a high-rate channel and rerouting of the high-rate channel requires fewer cross-connections than rerouting of the multiple low-rate channels **(see column 4 lines 22-27)**.

Response to Arguments

5. Applicant's arguments filed 5/6/2008 have been fully considered but they are not persuasive.

6. **With regard to applicant's remark for claim 1 (page 10)**, applicant submits that "specifies the maximum number of cross-connections at each node". However, Arslan teaches that the maximum number of cross-connections of circuit state element, wherein this circuit state element is of restoration processor which is connected to DACS (see shown in figure 1 and 2, and column 3 lines 52-59 and column 4 lines 46-61

and column 5 lines 3-27), and therefore the specified maximum cross-connection is of each node and meet the limitation, and rejection respectfully remains.

7. Applicant's arguments, see applicant's remark, filed 5/6/2008, with respect to 103 rejection on claims 3-4, 6, 8-9, 17-18, 20, and 22-23 have been fully considered and are persuasive. The 103 rejection of claims 3-4, 6, 8-9, 17-18, 20, and 22-23 has been withdrawn.

Allowable Subject Matter

8. Claim 3-6, 8-9, 17-20, and 22-23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Claims 29 and 30 are allowed. The reason for allowance is because the prior art do not teach the combinational limitation of:

- receiving one or more demands for service in a mesh network comprising a plurality of nodes interconnected by a plurality of links; and
- mapping each of the one or more demands onto a primary path and a restoration path in the network to generate a path plan for the one or more demands in the network, wherein:
- reduction of a portion of restoration time associated with failure-related cross-connections in the network is taken into account during the mapping;

- the mapping results in a maximum number of failure-related cross-connections at all nodes in the network being within a specified tolerance of a theoretical minimum;

- a graph-theoretic condition is used to derive the theoretical minimum; and

- the theoretical minimum is defined by maxn~N {[~n/dn]} where n, a node in the

- network, is an element of N, the set of all nodes in the network, 8_n is the number of unit demands terminated on node n, and dn is the number of edges incident on node n.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. . Crolsin (US6075766); Crolin (US5881048); Mukherjee et al. (US6850487); Chao et al. (US6549513).

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WUTCHUNG CHU whose telephone number is (571)270-1411. The examiner can normally be reached on Monday - Friday 1000 - 1500EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan Orgad can be reached on 571 272 7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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